# Yihan Zhang

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## Education

**Ph.D. Computer Science,** *Northwestern University, Evanston, IL* Expected Graduation: June 2023
**Research Area:** Network and Large Scale Distributed Robotics Systems
**Advisor:** Fabián E. Bustamante, Michael Rubenstein

**B.S. Computer Science,** *University of California, San Diego, CA* (GPA: 3.84/4) 2018
**Membership:** Tau Beta Pi - The Engineering Honor Society 2017
**Courses:** Algorithm, Data Structure, Software Engineering, Operating System, Machine Learning, Distributed System, Network, Database, Computer Architecture, Compiler Construction, Artificial Intelligence
**Skills:** **C**, **C++**, **Python, Go, Java**, TensorFlow, Embedded System, Matlab, Haskell, Ocaml, SQLite, Socket, Git, Linux

## Work Experiences

**Software Engineer Intern**, TuSimple, San Diego 2018

- Established automated software continuous integration solution for Github repos.
- Used Jenkins to monitor Github repos and to trigger Python scripts when receiving webhooks on repo update.
- Coordinated test servers through JSON-RPC to create dockers and test the software update.
- Integrated and automated server provisioning and configuration managing.

## Project Experiences

**Swarmnet**, C++ & Python 2019

- Developed a publish subscribe library for swarm robotics applications to provide communication abstractions
- Achieved decentralized communication without id assignment and state maintenance
- Protocol and implementation are designed to be low cost, being able to fit in extremely memory bounded embedded systems and low bandwidth networks.
- API with multiple language compatibility, C++ and Python, and platform compatibility, Kilobot and Coachbot

**Router Implementation**, C++ 2017

- CNS Espresso Prize for Excellence in Networking 2017 Award:
  *http://cns.ucsd.edu/cns-espresso-prize-for-excellence-in-networking-2017-awardee/*
- Implemented a router on top of Mininet, having functionalities such as **ARP handling**, **ICMP responding**, **IP forwarding** and **IP fragmenting**.
- Developed a **firewall** ensuring connections to be started only from private net and expired if inactive.
- Design details: *https://github.com/shzhangyihan/Mininet-Router-Implementation*

**Self-other Differentiation for Developmental Robotics**, Asada Lab, Osaka Univ. 2017

- Implemented **Autoencoder (TensorFlow)** for vision data compression.
- Implemented **RNN (TensorFlow)** to achieve unsupervised predictive learning.
- Used PCA to analyze the sequential activation of the middle RNN layer.

**Voice Controlled Robocar**, Java 2018

- Set up Donkey Car (an open source self-driving platform) on a RC car with Raspberry Pi.
- Collected visual and steering data to train the CNN model to achieve self-driving.
- Configured and trained Sopare (a sound pattern recognition platform) on PC to recognize voice commands.
- Implement **socket** connection between PC and RC car to achieve remote voice control of the self-driving car.

**Surfstore**, Java 2017

- Implemented a **distributed file storage** service based on **two phase commit** using **gRPC**.
- The client server receives and parses HTTP requests using **socket**.
- Three metadata servers ensuring fault tolerance mapping between filenames and data blocks on storing server.

**Grab and Meet**, Java, SD Hacks 17 2017

- Designed an SMS platform for lightweight and instant drink sharing using **Twilio** API and ngrok.
- Implemented Java programs on **Spark Java web framework** for data parsing and cacheing.
- Github Link: https://github.com/shzhangyihan/Grab-and-meet

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## Publication

- Yihan Zhang, Yukie Nagai. “Proprioceptive Feedback Plays a Key Role in Self-Other Differentiation.” *IEEE International Conference on Developmental Learning and Epigenetic Robotics*, 2018.